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Job No.: CTCE/BBMP/W.No.10/KRIDL/QB(SDBC)/2014-15 22.11.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
SAMPLE ID	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	22.11.2014

The results of the tests conducted on the bitumen sample for Semi Dense Bituminous Concrete are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	92	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	298	Min. 220

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22.11.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.11.2014

Sl No.	Details	Trial No. 1	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines	22.34	22.74	
	100* (W_2/W_1)%			22.54

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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22.11.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.11.2014

Sl No.	Details	Trial No. 1	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	306	
4	Aggregate Impact value = percent fines	22.42	21.54	
	100* (W_2/W_1)%			21.98

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Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Shape.T/2014-15 : 22.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 22.11.2014

Flakiness Index = **12.65%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index 26.50%

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Shape.T/2014-15 : 22.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 22.11.2014

Flakiness Index = **11.84%**

Elongation Index = **13.47%**

Result : Combined Flakiness & Elongation index 25.31%

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Stripping/2014-15 22.11.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Type of Mix	Semi Dense Bituminous Macadam
Date of Testing	22.11.2014

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Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.33	96.67
2	3.3		
3	3.5		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Macadam is 95%

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Sp_Wa/2014-15

22.11.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.11.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2027	2029	2028	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1277	1279	1278	
4	Weight of saturated surface dry aggregate in air	W_3 g	2024	2025	2022	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	747	746	744	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2012	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.691	2.696	2.704	2.698
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.742	2.747	2.741	2.742
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.70%	0.70%	0.50%	0.60%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Tele Fax : 23223227, Website : www.civiltechconsultants.com

E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Bit/2014-15 22.11.2014

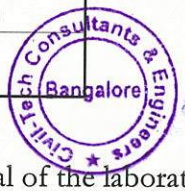
BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
SAMPLE I/D	Bloomfield Garden Road Ward No.10
DATE OF TESTING	22.11.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	26.00
7. Bitumen content in %	5.10	5.20
8. Average	**5.15**	



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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/Bit/2014-15 22.11.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
SAMPLE I/D	Bloomfield Garden Road Ward No.10
DATE OF TESTING	22.11.2014

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GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.36	5.34	5.34	94.66	90-100
4.75	262.5	55.32	60.67	39.33	35-51
2.36	63.42	13.37	74.03	25.97	24-39
1.18	47.15	9.94	83.97	16.03	15-30
0.3	26.52	5.59	89.56	10.44	9-19
0.075	25.63	5.40	94.96	5.04	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.63	6.88	6.88	93.12	90-100
4.75	252.4	53.25	60.13	39.87	35-51
2.36	53.12	11.21	71.34	28.66	24-39
1.18	36.58	7.72	79.06	20.94	15-30
0.3	34.72	7.32	86.38	13.62	9-19
0.075	36.23	7.64	94.03	5.97	3-8

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Job No.: CTCE/BBMP/W.No.10/KRIDL/SDBC/AGG/2014-15

22.11.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Bloom Field Garden Roads in Ward No.10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/W.O/676/2013-14 Dated: 05.03.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	22.11.2014

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	342	6.5	6.51	93.49	90-100	
4.75	2565	48.9	55.37	44.63	35-51	
2.36	647	12.3	67.70	32.30	24-39	
1.18	482	9.2	76.88	23.12	15-30	
0.3	415	7.9	84.78	15.22	9-19	
0.075	478	9.1	93.89	6.11	3-8	

Total Weight of Sample: **5300** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	242	4.6	4.57	95.43	90-100	
4.75	2625	49.5	54.09	45.91	35-51	
2.36	852	16.1	70.17	29.83	24-39	
1.18	493	9.3	79.47	20.53	15-30	
0.3	425	8.0	87.49	12.51	9-19	
0.075	396	7.5	94.96	5.04	3-8	

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